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### (54) Device for positioning bakery products in tins or similar

(57) A device (26) for positioning single bakery products (P), supplied by dropping, in recesses (24) of a tin (T); the tin (T) makes it unnecessary to remove any excess bakery products and comprises, next to each recess (24), at least one centring recess (38) disposed above the tin (T), which is formed by the bringing together of two facing half-shells, means (42) of moving the half-shells away from each other, to synchronize the

drop of the bakery products (P) with the advancing tin (T), and means (35) of expelling excess bakery products (P) from the said centring recess (38) into adjacent centring recesses (38), the said centring recesses (38) forming an alignment corresponding to the said at least one row (23) of receiving recesses (24).

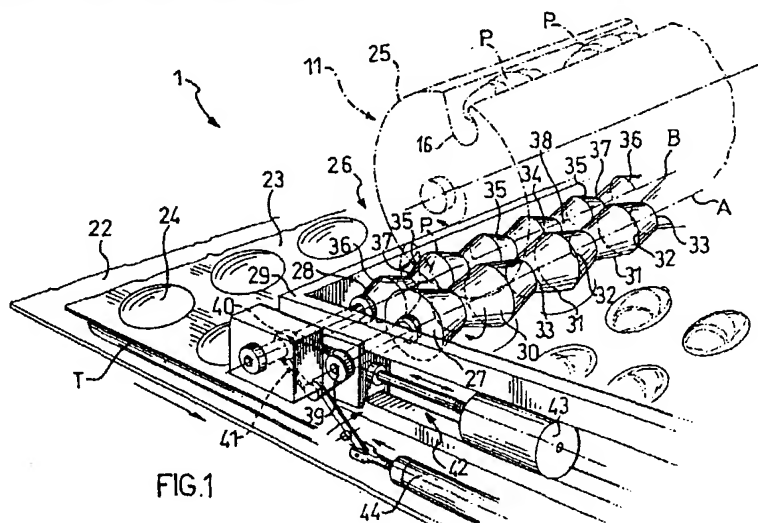


FIG.1

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## Description

The present invention relates to a device for positioning bakery products, supplied by dropping in a bakery production line, in tins or similar, having a plurality of receiving recesses disposed in aligned rows, each recess being designed to receive a single bakery product.

An acknowledged need in the management of bakery production lines of the automated type is to reduce the wastage of products which for one or another reason, are unable to reach the end of the said line.

One of the most common causes of the said wastage consists in the removal of those bakery products which, as a result of their irregular shape, are not automatically positioned in the recesses, for example the baking recesses of the baking tins, for which they are intended. This is because bakery products are very commonly supplied by dropping, after which it is possible that they will not be located exactly in the required position.

The technical problem underlying the present invention is that of providing a device, which meets the aforesaid requirement, for positioning the bakery products, supplied by dropping, in the corresponding receiving recesses.

This problem is resolved by a device as specified, which is characterized in that it comprises, next to each receiving recess of at least one of the said rows,

- at least one centring recess disposed above the tin, the said centring recess being formed by the bringing together of two facing half-shells;
  - means of moving the half-shells away from each other, to synchronize the dropping of the said bakery products with the advancing tin; and
  - means of expelling excess bakery products from the said centring recess into adjacent centring recesses;
- the said at least one centring recess forming an alignment corresponding to the said at least one row of receiving recesses.

The principal advantage of the device according to the invention consists in the fact that, with optimal efficiency, each receiving recess is made to receive a single bakery product, thus avoiding the requirement to remove any excess bakery products.

Further characteristics and advantages of the device according to the invention will be made clear by the description of a preferred embodiment of it, provided for information and without restriction, with reference to the attached drawings in which:

- Figure 1 is a perspective view in partial section of a station for positioning bakery products in a baking tin, which incorporates the device according to the invention;
- Figures 2 to 5 are partial plan views of the device

shown in Figure 1 and illustrate various phases of its operation; and

- Figures 2A to 5A are side views of the device shown in Figure 1, corresponding to each of Figures 2 to 5 respectively.

In Figure 1, a positioning station for bakery products P is indicated in a general way by the number 1, and is disposed next to a conveyor belt 22 which carries a tin T which is designed to enter an oven for baking the products P and which has aligned rows 23 of receiving recesses 24, which are in particular baking recesses, disposed at equal intervals in each of the said rows 23. The bakery products are supplied by dropping from a preceding station, for example a forming station, by suitable feed means 25, which in the present embodiment comprise a cylinder 25 which has channels 16 which receive an alignment of bakery products P in a quantity which completely fills one row 23 of the tin T.

The tin T is movable by advancing on the conveyor belt 22 in synchronization with the drop of the bakery products. The advance may be made to take place either stepwise or continuously.

Between the feed means 11 and the tin T, the positioning station 1 comprises a device, indicated in a general way by the number 26, for positioning the bakery products P in the tin T.

The device 26 comprises a first shaft 27 and a second shaft 28, having axes A and B respectively parallel to the tin T and to its rows 23, the shafts being disposed adjacent to each other in a position above the tin T and at a short distance from it.

The shafts 27, 28 extend across the whole width of the tin, and are supported by a suitable frame 29.

The first shaft 27 comprises a first outer rotating surface 30 which has a succession of truncated conical surfaces 31 joined alternately at their major bases 32 and their minor bases 33. The truncated conical surfaces 31 joined by any of the minor bases 33 form substantially a half-shell.

The truncated conical surfaces 31 of the first shaft 27 are characterized by an identical predetermined first frustum height and by an identical predetermined first angular aperture; in other words, the truncated conical surfaces 31 of the shaft 27 are all geometrically identical to each other and those joined by a single major base 32 are mirror images of each other, as are those joined by a single minor base 33.

The second shaft 28 also comprises a second outer rotating surface 34 which has a succession of truncated conical surfaces 35 joined alternately at the corresponding major bases 36 and minor bases 37.

The truncated conical surfaces 35 of the second shaft 28 are characterized by an identical predetermined second frustum height and by an identical predetermined second angular aperture; in other words, the truncated conical surfaces 35 of the shaft 28 are all geometrically identical to each other and those joined by a single

major base 36 are mirror images of each other, as are those joined by a single minor base 37.

In the present embodiment, the truncated conical surfaces 31, 35 have the same angular aperture; in other words, the said first and second angular apertures are identical.

Additionally, the second frustum height is equal to half of, or in any case is smaller than, the first cone height, so that the said shafts 27, 28 have outer surfaces, belonging to the corresponding truncated conical surfaces 31, 35, whose inclinations match each other. Similarly, the said shafts 27, 28 have outer surfaces, belonging to the corresponding truncated conical surfaces 31, 35, whose inclinations are different from each other.

The matching and different surfaces are arranged alternately so that, for each half-shell of the first shaft 27 identified by each of its minor bases 33, the second shaft 28 has a corresponding half-shell identified by one of its minor bases 37.

Owing to the geometry and positioning of the shafts 27, 28, the adjacent facing half-shells form a centring recess 38 for each of the said baking recesses 24 of a given row 23 of the tin T, each centring recess therefore being formed by the bringing together of the said half-shells.

The centring recesses 38 form an alignment corresponding, in practice, to a row 23 of baking recesses 24 lying beneath them.

Advantageously, in the present embodiment and as a result of the geometrical relationship between the heights of the truncated conical surfaces 31, 35, each minor base 33 and each major base 32 of the first shaft 27 corresponds to a minor base 37 of the second shaft 28.

Consequently, for each minor base 33 of the first shaft 27 there is a corresponding half-shell on the first shaft 27 and a half-shell on the second shaft 28 formed by truncated conical surfaces 35 of the second shaft 28 joined at the minor base 37 of the second shaft 28 corresponding to the said each minor base 33 of the first shaft 27 and having matching inclinations with respect to the truncated conical surfaces 31 of the first shaft 27 joined at the said each minor base 33. The said facing half-shells thus form a centring recess 38.

The device 26 also comprises means of expelling excess bakery products from a centring recess 38 to the adjacent centring recesses 38.

The expulsion means, in the present embodiment, generally consist of the previously mentioned truncated conical surfaces 35 of the second shaft 28 with different inclinations from those of the truncated conical surfaces 31 of the first shaft 27.

More precisely, the expulsion means relating to one of the said minor bases 33 of the first shaft 27, identifying, as has been stated, each centring recess 38, comprise the truncated conical surfaces 35 of the second shaft 28 joined to the minor base 37 of the second shaft

28 corresponding to each major base 32 of the first shaft 27.

In the present embodiment of the device 26 according to the invention, the shafts 27, 28 rotate in the same angular direction. One of the said shafts 27, 28 is driven so that it rotates. On a corresponding end, each of the first and second shafts 27, 28 has a pulley, indicated by 39 and 40 respectively.

The pulleys 39, 40 are connected by a transmission belt 41 which transfers the rotation from the driven shaft to the other shaft which is thus made to rotate.

The device 26 also comprises means 42 for moving the said facing half-shells away from each other, designed to synchronize the opening of the centring recesses 38 and the dropping of the bakery products P with the tin T advancing on the conveyor belt 22.

The means 42 for moving away from each other comprise an actuator 43, of the piston and cylinder type, associated with at least one end of a moving shaft of the said first and second shafts 27, 28 with respect to a corresponding fixed shaft of the said first and second shafts 27, 28.

In the present embodiment, the moving shaft is the first shaft 27, while the moving shaft is the second shaft 28.

The device 26 comprises, in interaction with the actuator 43, means 44 of tensioning the transmission belt 41, these means conventionally consisting of a further hydraulic piston and cylinder system, designed to keep the belt 41 at the correct tension at all times even during the movement apart of the shafts 27, 28, thus ensuring the continuing rotation of the shafts.

The operation of the device 26 in synchronization with the station 1 will be described below with reference to Figures 2 to 5 and 2A to 5A.

In Figures 2 and 2A, the shafts 27 and 28 are in the receiving position, and the centring recesses 38 are formed by the bringing together of the facing half-shells, the shafts 27 and 28 being in a position where they are close together.

A row 23 of empty baking recesses 24 of the tin T is disposed under the alignment of centring recesses 38.

In Figures 3 and 3A, the centring recesses 38 receive the baking products P from the feed means 11. The products P drop randomly into an irregular configuration and in some cases lie partially across the major bases 32 of the first shaft 27.

The particular disposition of the truncated conical surfaces 31, 35 described above, in interaction with the rotation imparted to the shafts 27, 28, causes a displacement of the bakery products which are expelled by the centring recesses which are not appropriate for them and fall, in predetermined disposition, between the corresponding half-shells (Figures 4, 4A).

At this point the means 42 of moving away from each other which separate the half-shells of the centring recesses 38, in other words the shafts 27, 28, come into operation, causing the dropping of the bakery products

P which are now in positions extremely close to the corresponding baking recesses and thus cannot leave these positions (Figure 5, 5A).

In addition to the advantages mentioned above, the device described above allows a substantial decrease in the manual intervention required for the positioning and/or the removal of bakery products in irregular positions.

This device also has a simple structure, can be constructed economically and is easily adaptable to any automated production line for bakery products.

It is also to be understood that the invention described above is not limited to positioning in a baking tin but extends to the precise positioning according to any other requirement that may arise in such a production line.

A person skilled in the art may make, in order to meet further and contingent requirements, numerous further modifications and changes to the device for positioning bakery products in tins as described above, all such modifications and changes falling within the scope of protection of the present invention, as defined in the attached claims.

#### Claims

1. A device (26) for positioning bakery products (P), supplied by dropping, in a tin (T) or similar, said tin (T) or similar comprising aligned rows (23) of receiving recesses (24), each designed to receive a single bakery product (P), characterized in that it comprises, next to each receiving recess (24) of at least one of said rows (23),
  - at least one centring recess (38) disposed above the tin (T), said centring recess (38) being formed by the bringing together of two facing half-shells;
  - means (42) of moving the half-shells away from each other, to synchronize the drop of said bakery products (P) with the advancing tin (T); and
  - means (35) of expelling excess bakery products (P) from said centring recess (38) into adjacent centring recesses (38); said centring recesses (38) forming an alignment corresponding to said at least one row (23) of receiving recesses (24).
2. A device (26) according to Claim 1, in which the alignment of centring recesses (38) is provided by the bringing together of a first and a second shaft (27, 28) having their axes (A, B) parallel, each of which has a corresponding outer rotating surface (30, 34) which has a succession of substantially truncated conical surfaces (31, 35) joined at corresponding major bases (32, 36) and minor bases (33, 37) which form the said facing half-shells.
3. A device (26) according to Claim 2, in which said first and second shafts (27, 28) rotate in the same angular direction.
4. A device (26) according to Claim 2 or 3, in which said first shaft (27) has truncated conical surfaces (31) identical to each other, characterized by a predetermined first frustum height and by a predetermined first angular aperture.
5. A device (26) according to Claim 2 or 3, in which said second shaft (28) has truncated conical surfaces (35) identical to each other, characterized by a predetermined second frustum height and by a predetermined second angular aperture.
6. A device (26) according to Claims 4 and 5, in which said second frustum height is smaller than said first cone height, said shafts (27, 28) having truncated conical surfaces (31, 35) brought together which have matching inclinations and truncated conical surfaces (31, 35) brought together which have different inclinations, the truncated conical surfaces (31, 35) with different inclinations of the second shaft (28) forming said means of expelling the excess bakery products (P).
7. A device (26) according to Claim 6, in which:
  - said second frustum height is equal to half of the first frustum height;
  - each minor base (33) and each major base (32) of the first shaft (27) corresponds to a minor base (37) of the second shaft (28);
  - for each minor base (33) of the first shaft (27) there is a corresponding half-shell on the first shaft (27) and a half-shell on the second shaft (28) delimited by truncated conical surfaces (35) of the second shaft (28) which are joined at the minor base (37) of the second shaft (28) corresponding to each minor base (33) of the first shaft (27) and which have inclinations matching those of the truncated conical surfaces (31) of the first shaft (27) joined at said each minor base (33), said half-shells delimiting a centring recess (38); and
  - the expulsion means for the said centring recess (38) comprise the truncated conical surfaces (35) of the second shaft (28) joined at each minor base (37) of the second shaft (28) corresponding to a major base (32) of the first shaft (27).
8. A device (26) according to one of Claims 2 to 7, in which said truncated conical surfaces (31, 35) have the same angular aperture.
9. A device (26) according to one of Claims 2 to 7, in

which said means (42) of moving the half-shells of the centring recesses (38) away from each other comprise an actuator (43) of the piston and cylinder type, associated with an end of a moving shaft (27) of said first and second shafts (27, 28) with respect to a corresponding fixed shaft (28) of said first and second shafts (27, 28).

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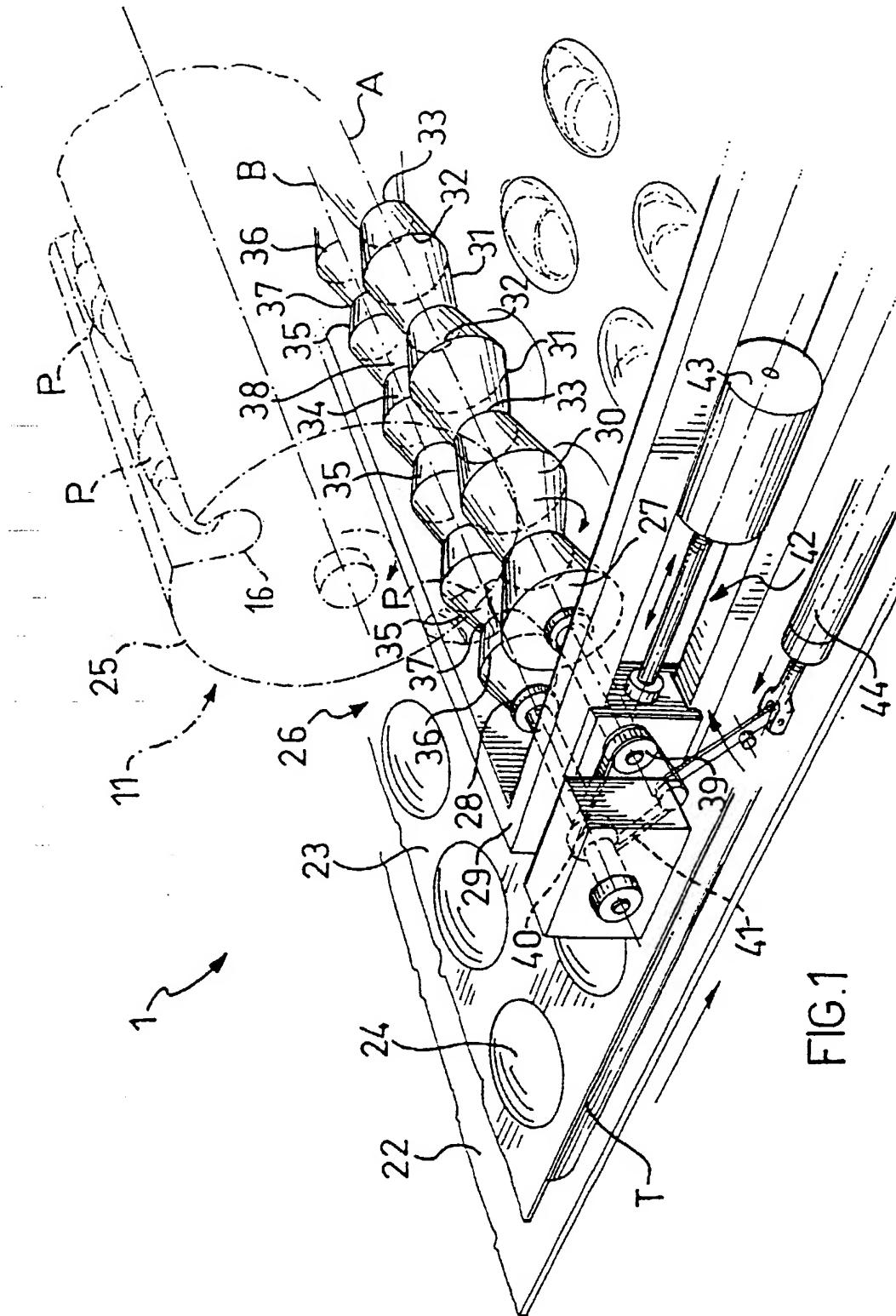
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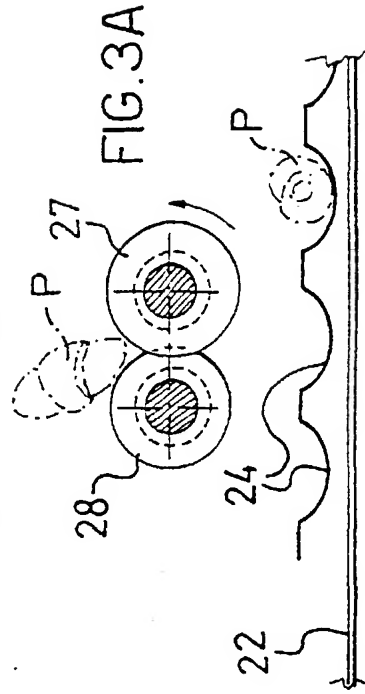
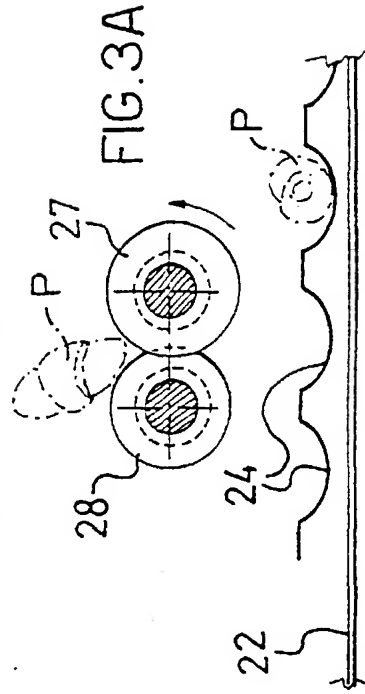
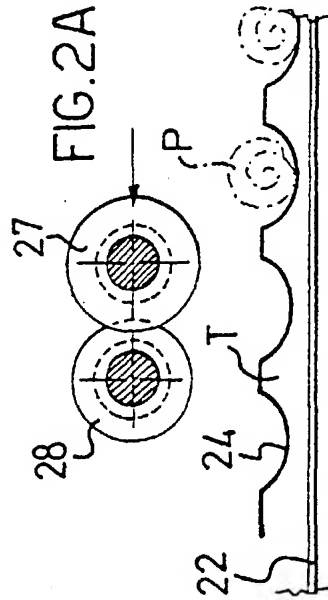
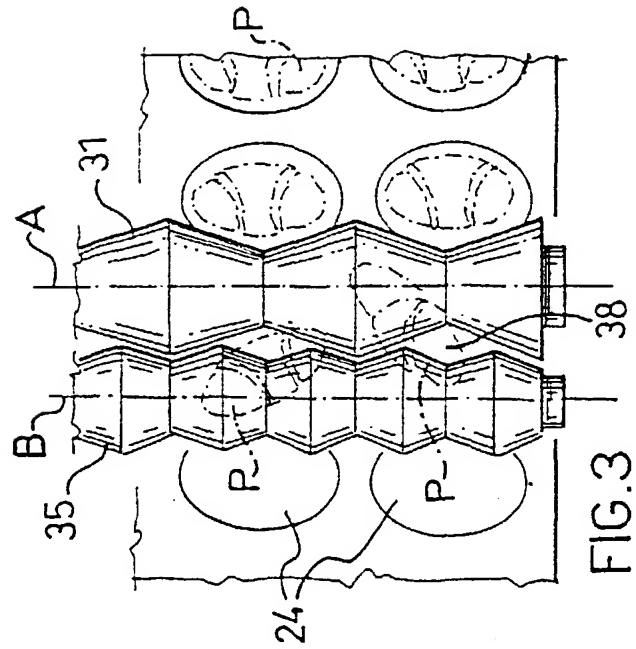
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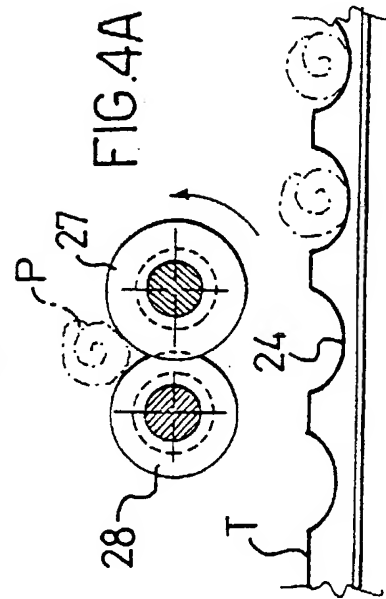
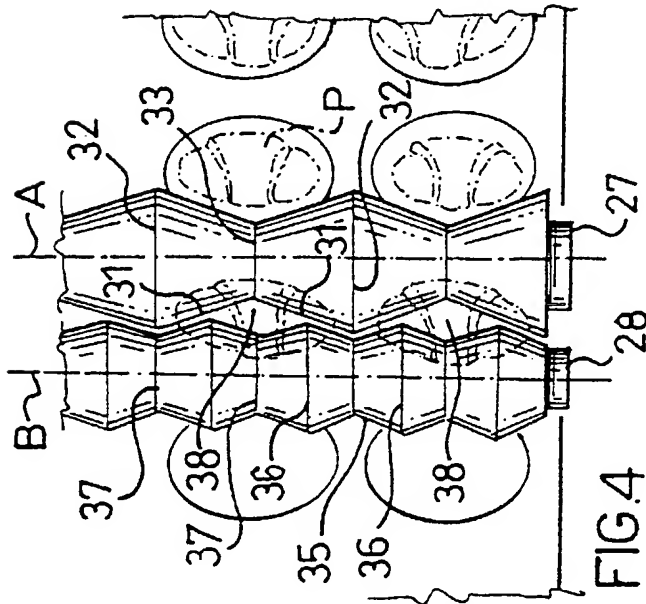
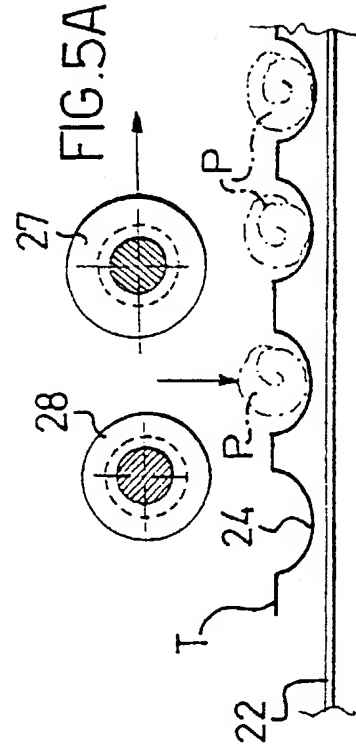
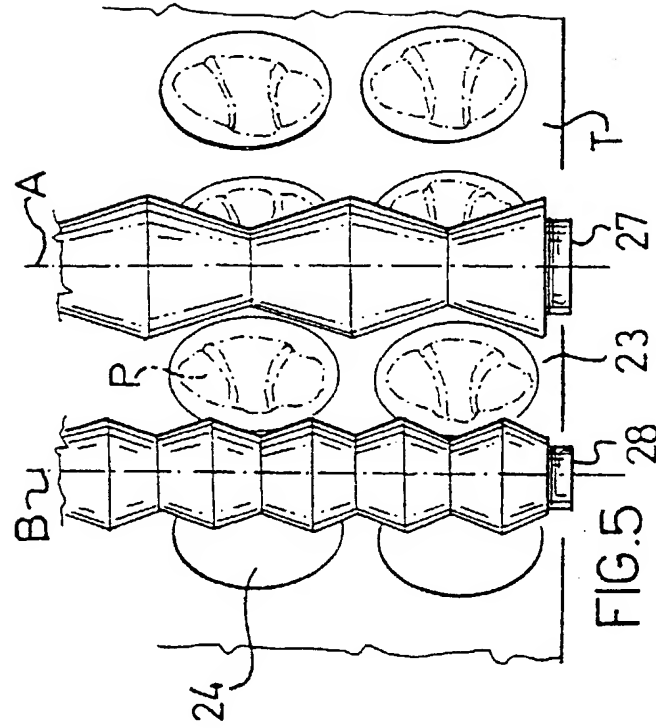
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## EUROPEAN SEARCH REPORT

Application Number  
EP 98 20 1626

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 4 019 621 A (HANSON) 26 April 1977 * column 3, line 50 - column 4, line 50; figures 2,3 *	1	A21C9/08
A	US 3 527 173 A (MULLVAIN, SR. ET AL) 8 September 1970 * column 3, line 38 - line 62; figures 5,6 *	1	
A	US 2 472 073 A (HAECKS) 7 June 1949 * the whole document *	1	
A	DE 11 55 736 B (VETTER)		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			A21C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28 August 1998	Examiner Silvis, H
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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